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Two-stage reconstruction of a full-thickness defect of the upper third of the auricle, using an autologous ipsilateral conchal cartilage graft; surgical technique

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ABSTRACT

The auricle's anatomy is unique in its three-dimensional architecture, multiple reliefs, concavities, and the thin nature of the skin covering the underlying cartilage. These anatomical characteristics make reconstruction of auricular defects as one of the most difficult challenges in reconstructive surgery.

We report the case of an 88-year-old Caucasian male presenting a full-thickness defect of the upper third of the auricle after resection of a malignant skin tumor. Total reconstruction of the defect was made by using an ipsilateral autologous conchal cartilage graft. Surgical procedure and outcomes are documented.

Introduction

Acquired deformities of the auricle are most commonly related to post traumatic injury, sequelae of infections, burn injury or after resection of malignant tumours. These auricle deformities range in severity from simple lacerations to extensive and complexes auricular avulsions [1].

Auricle defects with loss of tissues, limited to the concha does not require reconstruction, while defects located in the peripheral part require reconstruction in order to restore both the anatomy and the appearance of the auricle [2].

Full-thickness defects of the upper third of the auricle require a multi-layer reconstruction, restoration of the different reliefs and creating a rigid upper margin of the neo-helix- that is crucial to offer support when wearing glasses.

Case presentation

An 88-year-old Caucasian man presented an infiltrated basal cell carcinoma located on the posterior surface of the upper part of the left auricle (Fig. 1a). His medical background showed a hypercholesterolemia and heart disease without history of previous skin cancers.

Clinical and radiological examinations ruled out any suspicious neck or parotid lymph nodes.

Complete resection of the skin cancer was performed under general anaesthesia with total amputation of the upper third of the auricle (Fig. 1b). The per-operative histologic analysis confirmed the diagnosis of basal cell carcinoma with negative lateral and deep margins.

The first stage of reconstruction was carried out at the same operative time. The entire cartilage of the ipsilateral concha was harvested (Fig. 1c and d). An incision of the mastoid skin at the upper edge of the line of amputation was made. A subcutaneous dissection was performed with the creation of a skin pocket. The already harvested cartilaginous graft was then inserted into the skin pocket and sutured to the upper edge of the remaining cartilaginous framework using non-absorbable sutures (prolene 4/0) (Fig. 1e). A suction drain was inserted into the skin pocket and fixed in place. The inferior edge of the skin pocket was sutured to the upper edge of the remaining skin of the auricle using non-absorbable sutures (prolene 5/0) (Fig. 1f). A local antibiotic ointment was applied with a semi-compressive dressing.

Prophylactic oral antibiotic of Amoxicillin (1 gr twice daily for 10 days) was introduced with regular control of dressing. The suction drain was removed at 48 hours after surgery.

The second stage of reconstruction was carried out six weeks later and was performed under local anaesthesia. During this stage, a full-thickness skin graft was harvested from the sub-clavicular area on the left side. An incision around the skin pocket at the mastoid region was made. The cartilaginous graft, already fixed to the remaining cartilage of the auricle and the anterior skin were mobilised together anteriorly, making it possible to reform the anterior surface of the new upper third

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of the auricle (Fig. 2a). The skin graft was sutured to the posterior surface of the cartilaginous graft, using non-absorbable sutures. Finally, a superiorly based left-sided pre-auricular flap was harvested and was turned toward the auricle and sutured to the upper edge of the new upper third (Fig. 2b and c). A topical antibiotic ointment was applied with non-compressive dressing. An oral antibiotic of Amoxicillin (1 gr twice daily for 10 days) was prescribed. Regular follow-up and dressing control showed no evidence of complications.

On inspection, the wounds showed good healing with a satisfying aspect of the left auricle reconstruction.

Follow-up at 1, 3, 6 and 12 months after surgery showed no clinical signs of local or regional skin cancer recurrence (Fig. 2e and f). The patient found the aesthetical outcome of the reconstructed auricle very acceptable and was very pleased with the ability to wear glasses, something that he held dear (Fig. 2d).

Discussion

The auricle consists of two aesthetic sections: central concave part formed by the concha and peripheral part formed by the helix, antihelix and lobule [3]. When reconstructing auricle defects one must take into consideration this division of both aesthetic sections.

When managing auricle defects the choice of the reconstruction's method depends on multiple factors such as; patient's age, underlying etiology, anatomic location and size of defects, amount of tissue loss and surgeon's experience. In general, full-thickness defects required multilayered reconstruction, cartilage replacement and cover by a vascularized soft tissue. Several reconstructive methods have been described and according to Davis [4], the best material for ear reconstruction is the auricular tissue.

The use of the temporoparietal fascia as a vascularized soft tissue in association with cartilage grafting in the reconstruction of full-thickness upper third auricular defects have been described. Heshan A.H et aI [2] reported a series of fourteen patients presenting full-thickness defects of the upper third of the auricle reconstructed using this surgical technique with good outcomes.

In our case presented above, the cartilage graft has been harvested from the ipsilateral concha, we did not used the temporoparietal fascia flap to avoid large dissection surface, risking a high rate of flap failure, taking into account the patient's age and his medical background. According to our surgical technique described above, the creation of a skin pocket was less traumatic, avoided large dissection and was useful to cover all the anterior surface of the cartilage graft. We used only one skin graft to cover the posterior surface.

Follow-up at one year showed a good aspect of the reconstructed auricle, complete restoration of the anatomic reliefs with the ability to wear glasses.

Conclusion

Full-thickness defect of the upper third of the auricle requires multilayer reconstruction with cartilage support and soft tissue covering. The Conchal cartilage is preferable for grafting and the mastoid skin pocket is an alternative to the temporoparietal flap.

The Surgical procedure is simple with low rate of complications, acceptable outcomes and provides a good support to wear glasses.

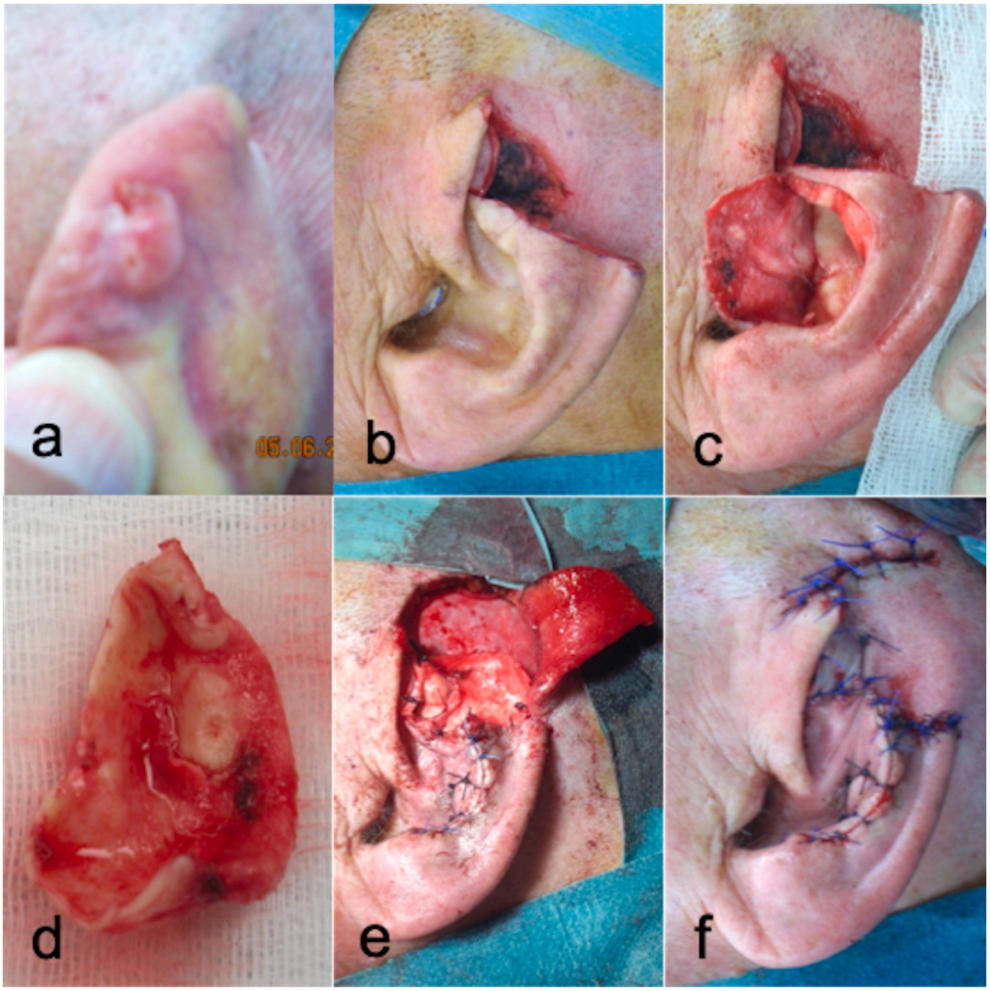

Fig. 1. 1a: showed the skin lesion on the posterior surface of the left auricle.
1b: tumor's resection with amputation of the upper third of the left auricle.
1c: skin flap preparation for harvesting the conchal cartilage graft.
1d: conchal cartilage graft harvested from the ipsilateral auricle.
1e: skin pocket flap on the mastoid region and fixation of the cartilage graft.
1f. cartilage graft completely covered by the skin pocket flap.

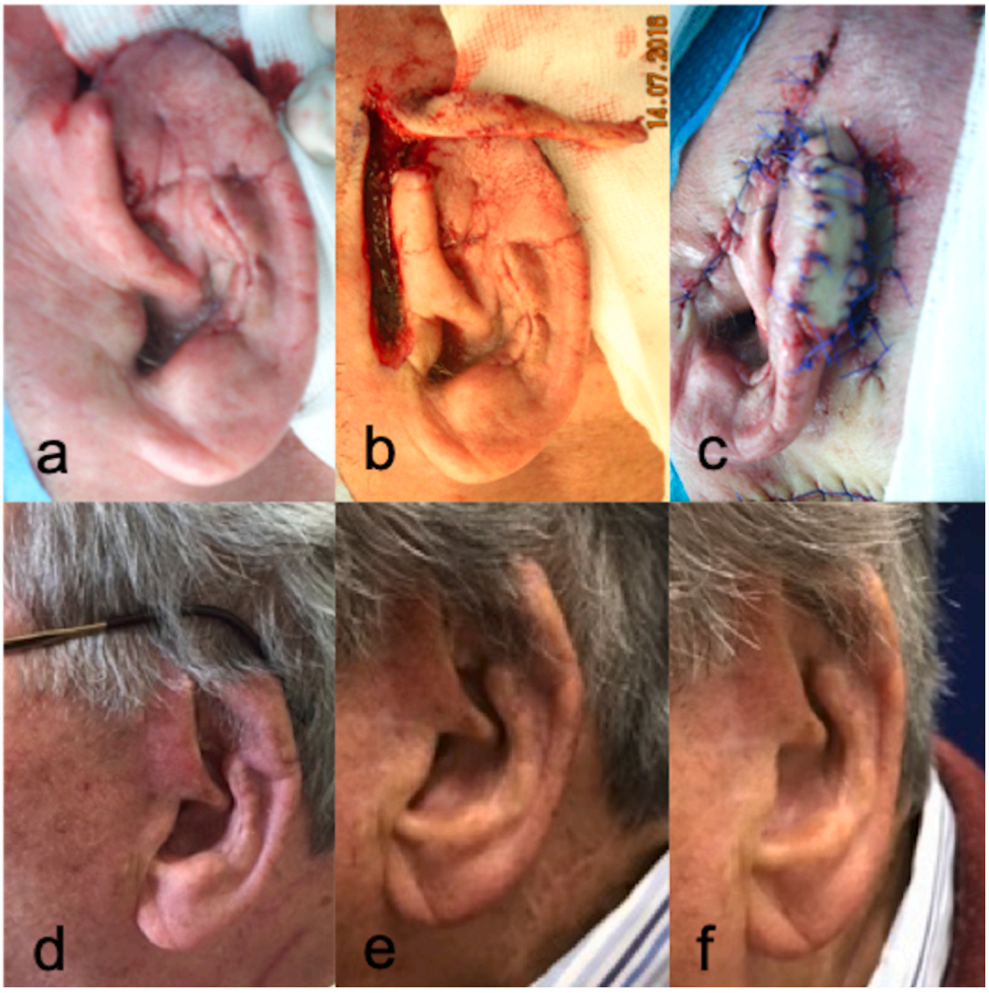

Fig. 2. 2a: second stage of reconstruction with mobilization of the entire cartilage graft covered by the skin flap, formed the anterior surface of the left auricle.
2b: harvesting of a superiorly based pre-auricular flap on the left side.
2c: pre-auricular flap sutured at the upper edge of the reconstructed left auricle with a skin graft at the posterior surface.
2d: six months post-operative view shows the aspect of the reconstructed auricle.
2e: one year post-operative view.
2f: one year post-operative view shows the patient's ability to wear glasses.

Disclosure

The authors haven nothing to disclose.
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Written consent was obtained from the patient.

CRediT authorship contribution statement

Bassel Hallak: writing, reporting, Funding acquisition. **Salim Bouayed:** Co-author, reporting, Funding acquisition. **Pedro S. Teiga:** Co-author, design, writing.

Declaration of competing interest

All authors declare no having any conflict of interest.

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